

REMARKS

Claims 1-10 are pending in this application. By this Amendment, claims 1-8 are amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance (for the reasons discussed herein); (b) do not raise any new issue requiring further search and/or consideration (since the amendments amplify issues previously discussed throughout prosecution); (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. The Amendment Satisfies All Formal Requirements

The Amendment filed November 17, 2003 was objected to under 35 U.S.C. §132 for introducing new matter into the disclosure. Accordingly, the claims and specification are amended to change the recitation of "third body gas" to "an excess-energy absorbing gas." The excess-energy absorbing is clearly disclosed in the specification. For example, paragraph [0005] of the specification discloses that it is necessary to raise the pressure in the ionization chamber 11 to the value included in the range of 10-1,000 Pa (usually 100 Pa) by the third component gas introduction mechanism 23 and use collision with the gas in order to absorb the excess-energy.

Withdrawal of the rejection of the Amendment under 35 U.S.C. §132 is respectfully requested.

II. Claims 1-8 Satisfy the Requirements Under 35 U.S.C. §112, First Paragraph

Claims 1-8 are rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. For at least the reasons set forth above with respect to the objection under 35 U.S.C. §132, Applicants respectfully request withdrawal of the rejection of claims 1-8 under 35 U.S.C. §112, first paragraph.

III. The Claims Define Patentable Subject Matter

Claims 1-10 are rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,566,652 to Kato in view of U.S. Patent No. 6,008,490 to Kato and further in view of U.S. Patent No. 5,194,739 to Sato et al. These rejections are respectfully traversed.

The applied art does not teach, disclose or even suggests preparing in advance a plurality of types of an excess-energy absorbing gas whose mass numbers are mutually different outside of the ionization chamber, selecting one type of an excess-energy absorbing gas and introducing it into the ionization chamber, determining whether interference peaks are generated and when an interference peak is generated, selecting another type of an excess-energy absorbing gas which generates no interference peak, as claimed in claim 1 and similarly claimed in claims 2-8.

The invention disclosed in Kato (652), Kato (490) relate to one type of mass spectrometry apparatus. The invention disclosed in Sato (739) relates to a liquid metal ion source of the type utilized in a secondary ion mass spectrometry (col. 1, lines 5-7). These inventions never relate to the ion attachment mass spectrometry (IAMS).

In Kato (652), there are the statements "a plural gas is supplied to the atmospheric pressure ion, source 7," "Many kinds of the gases are supplied besides the nebulization gas in the atmospheric pressure ion source 7."

The above "a plural gas" or "many kinds of gases" is/are perfectly different from the "excess-energy absorbing gas" of the present invention. The gases of the applied art have no

action of absorbing the excess energy which arises the problem in the ion attachment mass spectrometry.

Further, the outstanding feature of the present inventions of the pending claims 1-10 is, as compared with the invention disclosed in the cited references, to perform the measurement in a state of not generating interference peaks in the mass measurement data. This measurement result with no interference peaks is obtained by pertinently selecting one of a plurality of types of the "excess-energy absorbing gas" in the case of claims 1, 2 and 6.

Further, the measurement result with no interference peaks is obtained by pertinently selecting one of a plurality of types of ion emitters in the case of claims 3, 4, 7, 8, 9 and 10. In these cases, mass numbers of the "excess-energy absorbing gases" are mutually different, and mass numbers for metal ions emitted from the ion emitters are mutually different.

In the cited references of Kato (652), Kato (490) and Sato (739), there is no disclosure about the technical matter of preventing the generation of interference peaks.

The important feature of the present invention is as follows. In the ion attachment mass spectrometry (IAMS), an error measurement caused by the interference peaks is improved. Further, the only object to be essentially measured is accurately measured in a separated state by changing the "excess-energy absorbing gases" or the materials of the emitter and dislocating the position of the interference peaks on the mass axis.

In the IAMS of the present invention, the ions produced by the ion attachment to the object to be measured are metal ions. The typical materials of the metal ions are, for example, Li oxide, Si oxide and Al oxide. When heating these materials at about 600 °C, the metal ion (Li⁺) is emitted into the space. The emitter is applied with a predetermined bias voltage. This is for moving or transporting the generated ions. In addition, a repeller is disposed at the backside in order to prevent the produced ions from leaving to a distant place

from the mass spectrometry. The IAMS of the present invention does not need a special applied voltage.

The invention of Kato (652) relates to an atmospheric pressure ionization mass spectrometry apparatus. In the apparatus of Kato (652), by using the nebulizer probe applied with high voltage (3-6 kV), the charged droplets are generated, these charged droplets have repeated collisions in the atmospheric space, and finally, fine sample ions are made. The apparatus of Kato (652) is not the IAMS and further perfectly different from the spectrometry of the present invention. In accordance with the apparatus of Kato (652), it is considered that various and many kinds of ions are generated.

In contrast, in accordance with the present invention, the ions to be measured which are finally produced, are not various, and they come to be within a predetermined range anticipated comparatively. Nevertheless, since the dimmer ions are generated and the error measurements occur, the apparatus and method are proposed to solve those problems by the present inventions.

The invention of Kato (490) relates to the method of determining a quasi-molecule ion. The method of Kato (490) is that the quasi-molecule ions are assumed and a table (an adduct ion table) indicating a series of ions to be added against the quasi-molecule ions is prepared, and on the basis of comparing a peak position due to the formed quasi-mass spectrum with a peak position due to a measured mass spectrum, an extent of agreement between both is estimated, and further, an ion with highest agreement is regarded as an actual quasi-molecule ion.

The invention of Sato (739) related to a liquid metal source capable of producing cesium ions stably. This liquid metal ion source has a needle type emitter (3) and an extracting electrode (4). A voltage 2-10 kV (typically 5kV) is impressed between the needle type emitter and the extracting electrode to extract ions. Therefore, if this ion source is used

instead of the ion source emitter of the present invention, ions with sufficiently high energy emitted from the needle type emitter is dissociated by the collision with a sample gas, since there is an electric field around the emitter. The ions source of Sato (739) cannot attain the object or effect of the present invention, that is, the ionization without dissociating the sample gas.

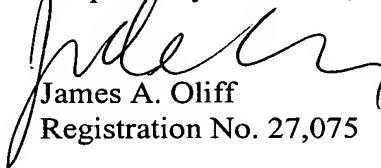
In accordance with the argument, it is impossible for one skilled in the art to invent the method and apparatus for IMAS of the present invention in view of Kato (652), Kato (490) and Sato (739). Withdrawal of the rejection of the claims under 35 U.S.C. §103 is respectfully requested.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,


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Attachment:

Petition for Extension of Time

Date: December 6, 2004

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